

LONDON- WEST MIDLANDS ENVIRONMENTAL STATEMENT

Volume 5 | Technical Appendices

CFA25 | Castle Bromwich and Bromford

Data appendix (AG-001-025)

Agriculture, forestry and soils

November 2013

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November 2013



Department
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Appendix AG-001-025

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1 Introduction

1.1.1 The agriculture, forestry and soils appendices for the Castle Bromwich and Bromford community forum area (CFA 25) comprise:

- soils and agricultural land classification surveys (Section 2);
- forestry (Section 3); and
- farm impact assessment summaries (Section 4).

1.1.2 Maps referred to throughout the agriculture, forestry and soils appendix are contained in the Volume 5, Map Book Agriculture, forestry and soils.

2 Soils and agricultural land classification surveys

2.1 Background

2.1.1 The soils and agricultural baseline conditions reported have been established from desktop studies and site surveys.

2.1.2 Information gathered by desktop studies has related primarily to the identification of soil resources in the study area, the associated physical characteristics of geology, topography and climate which underpin the assessment of agricultural land quality, and the disposition of land uses. The main sources of information have included:

- National Soil Map¹;
- Soils and Their Use in Midland and Western England²;
- solid and superficial deposits from the Geology of Britain viewer³;
- Forest Inventory⁴;
- gridpoint meteorological data for Agricultural Land Classification of England and Wales⁵;
- Provisional Agricultural Land Classification of England and Wales (1:250,000)⁶;
- Likelihood of Best and Most Versatile Agricultural Land (1:250,000)⁷;
- agri-environment schemes⁸;
- aerial photography, including Google Earth; and
- on-site soil and Agricultural Land Classification surveys⁹.

2.1.3 Information gathered by field survey has related to the enhancement of desk-based information on soils and agricultural land quality, and the engagement with landowners and tenants to establish the nature and extent of agricultural, forestry and related rural enterprises.

1. Cranfield University (2001). *The National Soil Map of England and Wales 1:250,000 scale*. Cranfield University: National Soil Resources Institute.

2. Soil Survey of England and Wales (1984). *Soils and Their Use in Midland and Western England*. Harpenden.

3. British Geological Survey (2013). [Online] Available at: <http://bgs.ac.uk/products/onshore/home.html?src=topNav>.

4. Forestry Commission (2013). *Woodland Area, Planting and Restocking* [Online]. Available at: [www.forestry.gov.uk/pdf/WAPR2013.pdf/\\$FILE/WRAP2013.pdf](http://www.forestry.gov.uk/pdf/WAPR2013.pdf/$FILE/WRAP2013.pdf)

5. Meteorological Office (1989). Gridpoint Meteorological data for Agricultural Land Classification of England and Wales and other Climatological Investigations.

6. Ministry of Agriculture, Fisheries and Food (MAFF) (1983). *Agricultural Land Classification of England and Wales (1:250,000)*. MAFF.

7. Department for Environment, Food and Rural Affairs (2005). *Likelihood of Best and Most Versatile Agricultural Land (1:250,000)*.

8. Multi-Agency Geographical Information for the Countryside (MAGIC) available on line @ www.magic.gov.uk.

9. Natural England Survey (1996). Ref 048/96 Brickfield Farm, Nr Solihull. Major Investment Site Proposal. Agricultural Land Classification. ALC Map and Report. Natural England Survey (1996) Wheeley Moor Farm, Coleshill. Major Investment Site Proposal. ALC Map

- 2.1.4 Where the collection of agricultural site information has enabled a review/refinement of published information, this was undertaken in accordance the methodology prescribed by Ministry of Agriculture, Fisheries and Food (MAFF).¹⁰
- 2.1.5 Information obtained from farm impact assessment interview surveys has been taken as a factual representation of local agricultural and forestry interests and has not been subject to further evaluation.

2.2 Soils and land resources

- 2.2.1 This part of the technical appendix describes the findings of a desktop study that identified existing soil and agricultural land resources in the study area.
- 2.2.2 The location and extent of different soil types and agricultural land in the different ALC grades are influenced by topography and drainage, and by geology and soil parent materials, which are described in turn in the following sections. This section then provides a description and distribution of the main soil types encountered along the study corridor.

Topography and drainage

- 2.2.3 The Proposed Scheme crosses a short length of open land in the eastern part of the study area as it emerges from the built up edge of Birmingham. The main topographic feature of this area is the floodplain of the River Tame. This occupies land generally lower than 80m AOD, and is characterised by wet areas and water bodies associated with an earlier course of the river.
- 2.2.4 The floodplain is bounded on its south and south-eastern edge by a steep wooded scarp slope. For much of its length this abuts the M6 motorway. Above the scarp the land rises to a low ridge at 106m AOD from which the land falls away gently eastwards to a height of 90m AOD at the boundary of the study area.

Geology and soil parent materials

- 2.2.5 The Proposed Scheme within the study area crosses land predominantly underlain by Triassic mudstones (Mercia Mudstone Group). The ridge of higher ground is underlain by a siltstone bed. However, in the immediate vicinity of the route the bedrock is overlain by superficial deposits of Quaternary and recent age. On the higher ground to the south-east of Park Hall Wood, these are primarily glaciofluvial sand and gravel deposits, which give way to more mixed Head deposits to the east. The floodplain of the River Tame is characterised by alluvial deposits of clay, silt, sand and gravel.
- 2.2.6 A list of geological strata occurring within the study area is provided in age order in Table 1 and shown on Map WR-02-025 (Volume 5).

10. Ministry of Agriculture, Fisheries and Food (MAFF) (1988), *Agricultural Land Classification of England and Wales – Revised guidelines and criteria for grading the quality of agricultural land*. MAFF.

Table 1: Bedrock and oil forming materials

| Formation | Composition/soil parent material |
|--------------------------|--|
| Bedrock | |
| Mercia Mudstone Group | Red mudstones and layers of dolomitic siltstones. |
| Superficial deposits | |
| Alluvium | Compressible silty clay, (silt, sand and gravel). |
| River Terrace Deposits 1 | Sand and gravel. |
| River Terrace Deposits 2 | Sand and gravel. |
| Glaciofluvial deposits | Sand and gravel |
| Head | Poorly sorted and stratified sand and gravel with local lenses of silt, clay, peat or organic material |

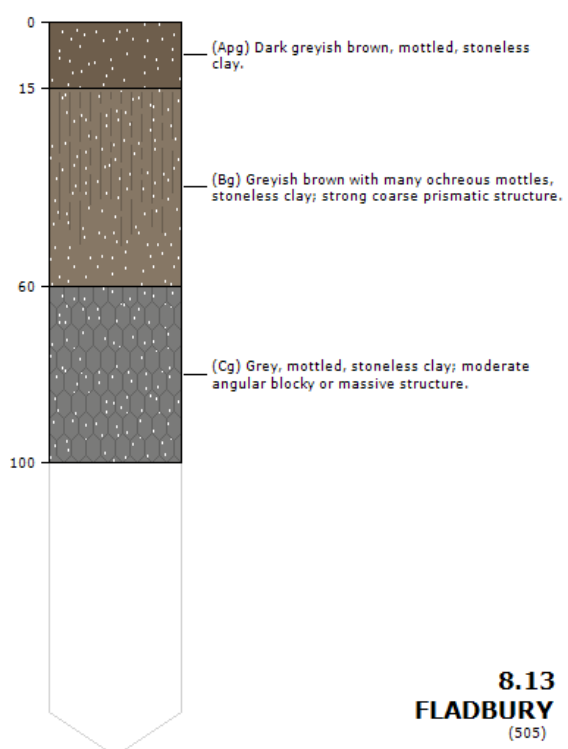
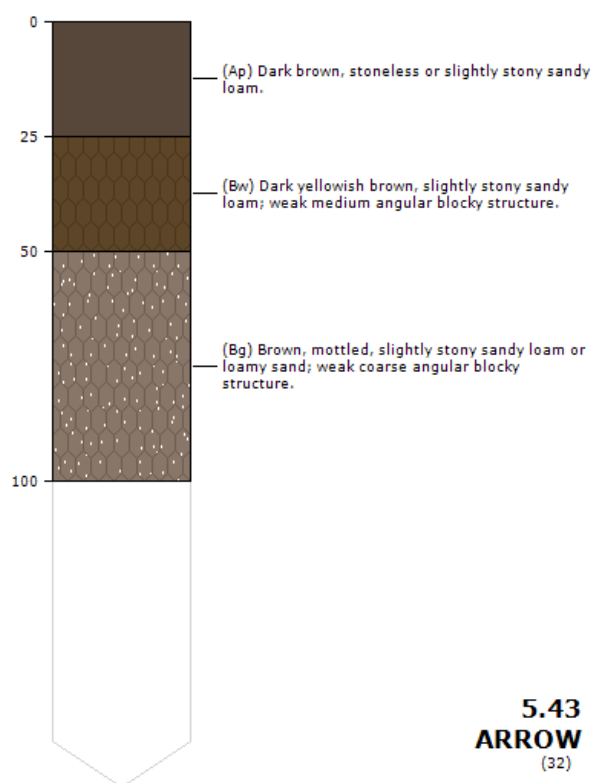
Description and distribution of soil types

- 2.2.7 The characteristics of the soils are described by the Soil Survey of England and Wales¹¹ that accompanies the National Soil Map¹². The soils are grouped into soil associations of a range of soil types (soil series) showing similar characteristics. The National Soil Map shows the following four associations in the undeveloped eastern parts of the study area. The floodplain of the River Tame is occupied by alluvial soils of the Fladbury 1 association; to the immediate north and south of the floodplain are soils of the Arrow association developed on superficial sand and gravel deposits; and where the underlying mudstones occur soils of the Brockhurst 1 and Clifton associations are present (see Volume 5: Map AG-02-025).
- 2.2.8 Of these associations only the Fladbury 1 and Arrow soils are present in the study area immediately defined by the route. Descriptions of these soils are provided in the Soil Survey's bulletin and are summarised as follows:
- the Arrow association consists of typically coarse loamy soils. These are of variable permeability and occasionally seasonally waterlogged. They are most commonly assessed as being of soil wetness class (WC) II –III. The extent of these soils is largely determined by the occurrence of superficial glaciofluvial sands and gravels. They occur predominantly on the higher ground to the south-east of Park Hall Wood; and
 - the Fladbury 1 association soils occupy deep clayey alluvial soils on the valley floor. They are gley soils, clayey throughout and prominently mottled below the topsoil. The slowly permeable subsoils are subject to groundwater waterlogging due to seasonal fluctuations in river levels and perennial flooding. The duration of waterlogging is variable dependent upon local topographic variability, but these soils are generally within WC IV.
- 2.2.9 There are no site descriptions of these soils, but typical profiles are described in the Soil Bulletin as follows:

11. Soil Survey of England and Wales (1984). Soils and their Use in Midland and Western England, Bulletin 12.

12. Soil Survey of England and Wales (1983). Soils of Midland and Western England, Sheet 3.

Figure 1: Predominant soil profile descriptions¹³



13. LandIS Land Information System. A Guide to the Soils of England and Wales. Online Interactive Toolkit.
www.landis.org.uk/services/soilsguide

2.3 Soil and land use interactions

Agricultural land quality

- 2.3.2 The open land element of the Castle Bromwich and Bromford section has been subject to an intensive desk based assessment which has relied on the interpretation of soil mapping, topography and agro-climatic data, and the interactions between each factor. This resulted in an assessment of the likely soil textures, soil drainage status, landform, gradient, presence of or depth to poorly permeable soil layers and the extent to which crop growth may be limited by soil droughtiness.
- 2.3.3 A professional judgement has then been made of predominant ALC grade which is likely for a soil with the given characteristics found, in the agro-climatic zone of the location within the area. The judgement is influenced by the surveyor's experience of previous surveys in the locality and on similar soil types. The resulting grade is that which is considered to be the most likely grade that would be found should a detailed site investigation be conducted, although this does not mean in all cases that grade will be found in practice. The ALC for the study area are illustrated on Maps AG-01-066b to AG-01-068a (Volume 5).
- 2.3.4 Contextual land quality information is derived from the provisional ALC maps of England and Wales, produced by MAFF in the 1960s and 1970s. These maps show the study area within the open land of the section to be provisionally mapped Grade 3, good to moderate quality land, with included woodland identified as non-agricultural land. This mapping does not distinguish subdivision within Grade 3.
- 2.3.5 These maps were originally published at a scale of 1:63,360 and are available at a scale of 1:250,000 in paper and digital formats. The main limitations of these provisional maps are that they are published on strategic scales only and according to a methodology which has since been revised twice. Therefore they cannot be used to definitively classify individual sites and hence further data analysis was conducted.
- 2.3.6 There is no post-1988 ALC information available within the study area. However, information is available for nearby sites at Brickfield Farm, Chelmsley Wood and Wheeley Moor Farm, Coleshill, where the National Soil Map identifies the presence of Arrow association soils. In these locations these soils have been mainly classified as Subgrade 3a in quality. Regard has been paid to this in interpreting the soil and ALC information within the study area.
- 2.3.7 The principal physical factors influencing agricultural production and land quality are climate, site and soil, and the interactions between them.

Agro-climatic limitations

- 2.3.8 The climate in this part of England does not in itself place any limitation upon land quality, but the interactions of climate with soil characteristics are important in determining the wetness and droughtiness limitations of the land. The influence of climate on WC is assessed by reference to median field capacity days (FCD) when the soil moisture deficit (MDM) is zero, WC and topsoil texture. Droughtiness is determined by comparing the available water capacity of the soil (AP), adjusted for the crop, with the MDM for the locality for two crops, winter wheat (MDM WHT) and potatoes (MDM POT).
- 2.3.9 The local agro-climatic factors have been interpolated from the Meteorological Office's standard 5km grid point dataset at two points within the study area, as set out in Table 2. There is only a small variation across the study area. Average annual rainfall (AAR) is from 640 to 675mm with higher ground tending to receive more. Median FCDs are from 138 to 143 days, with the longer periods being on the higher ground. MDM is 99–105mm for wheat and 89–97mm for potatoes, with the larger values occurring on lower ground.

Table 2: Interpolated agro-climatic data

| Agro-climatic parameter | Cubbington | Offchurch |
|--|------------|-----------|
| Altitude (mAOD) | 87 m | 65 m |
| Average annual rainfall (AAR) | 654 mm | 646 mm |
| Accumulated temperature >0°C (ATo) ¹⁴ | 1390 day° | 1416 day° |
| Field capacity days (FCD) | 142 days | 138 days |
| Average moisture deficit, wheat (MDM WHT) | 101 mm | 105 mm |
| Average moisture deficit, potatoes (MDM POT) | 90 mm | 96 mm |

Site limitations

- 2.3.10 The assessment of site limitations is primarily concerned with the way in which topography influences the use of agricultural machinery and hence the cropping potential of land. Gradient and microrelief¹⁵, with complex changes of slope angle or direction over short distances, are not considered limiting. Flooding in the study area is limited to the floodplain of the River Tame. This is a potential limitation but its incidence is difficult to ascertain. Flood risk is determined by the extent, duration, frequency and timing of flooding events which may not have been recorded. However, the published flood maps by the Environment Agency can be used as a guide (see Volume 5: Appendix WR-002-025) with regard to the physical condition of the land. Insofar as land within the floodplain that may be considered to be potentially agricultural, it is judged that its quality is compromised by soil wetness considerations.

¹⁴. Accumulated temperature is the excess of daily air temperatures above a selected threshold temperature (0°C), summed over a specified period (January to June which is the critical growth period for most crops).

¹⁵ Complex changes of slope angle and direction over short distances or the presence of boulders or rock outcrops, even on level or gentle slopes, which can severely limit the use of agricultural machinery.

Soil limitations

- 2.3.11 The main soil properties which affect the cropping potential and management requirements of land are texture, structure, depth, stoniness and chemical fertility. Together they influence the functions of soil and affect the water availability for crops, drainage, workability and trafficability. The main soil characteristics within the study area are:
- coarse loamy and sandy textures in river terrace drifts and glaciofluvial deposits; and
 - clayey textures in alluvial soils in the valley bottoms with fluctuating groundwater and flood risk.
- 2.3.12 Soil depth and chemical limitations are not encountered.

Interactive limitations

- 2.3.13 The physical limitations which result from interactions between climate, the site and soil are soil wetness, droughtiness and erosion. Each soil can be allocated a WC based on soil structure, evidence of waterlogging and the number of FCDs; the topsoil texture then determines its ALC Grade in accordance with Table 6 of the MAFF ALC guidelines (as detailed in Figure 2).
- 2.3.14 The loamy and sandy soils of the Arrow association are permeable and largely well drained, but may have slight seasonal waterlogging. They are typically of WC II-III, and are without a wetness limitation. These soils will have an upper grading threshold of Grade 2 in this respect. The clayey textures of the Fladbury 1 soils with their slow permeability and seasonal waterlogging and/or flooding are attributed to WC IV, and suffer a wetness constraint limiting the land to no greater than Subgrade 3b.
- 2.3.15 Soil texture and structure determine the AP of the soil profile. When calculated against the demands of a growing wheat and potato crop in the locality given by the climatic variable, the MDM, a moisture balance is produced from which a droughtiness limitation can be assessed. The methodology used for calculating the severity of a droughtiness limitation is given in Figure 3. The lighter textured soils of the Arrow association tend to have an available water constraint and thus a droughtiness limitation. The severity of the limitation is largely determined by stone content and places the soils in the range of Grade 2 to Subgrade 3b in the ALC.
- 2.3.16 The Arrow association soils based primarily on glaciofluvial sands and gravels have been assessed as Subgrade 3a reflecting a slight droughtiness limitation. Reference in this assessment has been made to the conclusions of the detailed survey work at Brickfield Farm. Those parts of the site attributed to Arrow association on the National Soil Map were described as comprising "stony fine or medium sandy loam topsoil which lies directly over subsoils of either a fine or medium sandy loam and sandy clay loam at depth". Stone content was a determining consideration and the soils were assessed as Subgrade 3a.

- 2.3.17 With the seasonally waterlogged soils of the Fladbury 1 association, where the wetness/texture limitation is more restrictive, the land has been assessed as Subgrade 3b. However, all the relevant land supporting these soils is located within the Park Hall nature reserve where the primary land use objectives are non-agricultural. In such circumstances it is more appropriate to allocate the land, which is associated with integral wetland and woodland elements, to the non-agricultural category of the ALC which includes uses such as private parkland, public open spaces, sports fields and allotments.

Figure 2: ALC grade according to soil wetness¹⁶

| Wetness Class | Texture ¹ of the top 25 cm | Field Capacity Days | | | | |
|-------------------------------------|---------------------------------------|---------------------|---------|---------|---------|------|
| | | <126 | 126-150 | 151-175 | 176-225 | >225 |
| I | S ² LS ³ SL SZL | 1 | 1 | 1 | 1 | 2 |
| | ZL MZCL MCL SCL | 1 | 1 | 1 | 2 | 3a |
| | HZCL HCL | 2 | 2 | 2 | 3a | 3b |
| | SC ZC C | 3a(2) | 3a(2) | 3a | 3b | 3b |
| II | S ² LS ³ SL SZL | 1 | 1 | 1 | 2 | 3a |
| | ZL MZCL MCL SCL | 2 | 2 | 2 | 3a | 3b |
| | HZCL HCL | 3a(2) | 3a(2) | 3a | 3a | 3b |
| | SC ZC C | 3a(2) | 3b(3a) | 3b | 3b | 3b |
| III | S ² LS SL SZL | 2 | 2 | 2 | 3a | 3b |
| | ZL MZCL MCL SCL | 3a(2) | 3a(2) | 3a | 3a | 3b |
| | HZCL HCL | 3b(3a) | 3b(3a) | 3b | 3b | 4 |
| | SC ZC C | 3b(3a) | 3b(3a) | 3b | 4 | 4 |
| IV | S ² LS SL SZL | 3a | 3a | 3a | 3b | 3b |
| | ZL MZCL MCL SCL | 3b | 3b | 3b | 3b | 3b |
| | HZCL HCL | 3b | 3b | 3b | 4 | 4 |
| | SC ZC C | 3b | 3b | 3b | 4 | 5 |
| V | S LS SL SZL | 4 | 4 | 4 | 4 | 4 |
| | ZL MZCL MCL SCL | 4 | 4 | 4 | 4 | 4 |
| | HZCL HCL | 4 | 4 | 4 | 4 | 4 |
| | SC ZC C | 4 | 4 | 4 | 5 | 5 |
| Soils in Wetness Class VI - Grade 5 | | | | | | |

Notes for Figure 2: 1. For naturally calcareous soils with more than 1% calcium carbonate (CaCO₃) and between 18% and 50% clay in the top 25cm, the grade, where different from that of other soils, is shown in brackets; and 2. Sand is not eligible for Grades 1,2 or 3a; 3. Loamy sand is not eligible for Grade 1.

16. MAFF (1988).

Figure 3: Methodology for calculating the severity of a droughtiness limitation to ALC grading (derived from MAFF, 1988)

$$AP \text{ wheat (mm)} = \frac{TA_{vt} \times LT_t + \sum (TA_{vs} \times LT_{50}) + \sum (EA_{vs} \times LT_{50-120})}{10}$$

where

TA_{vt} is Total available water (TA_v) for the topsoil texture

TA_{vs} is Total available water (TA_v) for each subsoil layer

EA_{vs} is Easily available water (EA_v) for each subsoil layer

LT_t is thickness (cm) of topsoil layer

LT_{50} is thickness (cm) of each subsoil layer to 50 cm depth

LT_{50-120} is thickness (cm) of each subsoil layer between 50 and 120 cm depth

Σ means 'sum of'.

$$AP \text{ potatoes (mm)} = \frac{TA_{vt} \times LT_t + \sum (TA_{vs} \times LT_{70})}{10}$$

where

LT_{70} is thickness (cm) of each subsoil layer to 70 cm depth

MB (Wheat) = AP (Wheat) - MD (Wheat)

MB (Potatoes) = AP (Potatoes) - MD (Potatoes)

Where

MB is the Moisture Balance

AP is the Crop-adjusted available water capacity

MD is the moisture deficit, as determined by the agro-climatic assessment.

Grade according to droughtiness

| Grade/ Subgrade | Moisture Balance limits (mm) | | |
|--------------------|------------------------------|------------|-----------------|
| | <i>wheat</i> | | <i>potatoes</i> |
| 1 | +30 | <i>and</i> | +10 |
| 2 | +5 | <i>and</i> | -10 |
| 3a | -20 | <i>and</i> | -30 |
| 3b | -50 | <i>and</i> | -55 |
| 4 | <-50 | <i>or</i> | <-55 |

3 Forestry

- 3.1.1 Assessment of forestry resources has primarily had regard to the Forestry Inventory¹⁷.
- 3.1.2 The area of land under forestry (i.e. trees and woodland) within a 4km wide study area (2km either side of the route centre line of the Proposed Scheme) has been determined using GIS, and is shown in Table 3 below.
- 3.1.3 Forestry resources within the study area are limited to the steep slope bounding the floodplain of the River Tame and comprise ancient and semi-natural woodland; an important habitat contributing to the suite of habitats within the Park Hall nature reserve.

Table 3: Area of woodland within the study area and land required for construction

| | Area of forestry land (ha) | Forestry land as a % of total land area |
|---|----------------------------|---|
| Forestry land in study area | 190.2 | 4 |
| Forestry land within area required for construction | 1.5 | 1.4 |

- 3.1.4 The coverage of forestry land in the study area i.e. a 4km-wide corridor is less than the national average for woodland coverage (10%). Forestry land is, therefore, a resource of high sensitivity in this locality.
- 3.1.5 The extent of forestry land required for the construction of the Proposed Scheme is some 1.4% of the total land requirement, which is an impact of low magnitude in terms of the assessment methodology. This a minor adverse effect which is not significant.

17. The Forestry Commission's National Forest Inventory Woodland and Ancient Woodland

4 Assessment of effects on holdings

- 4.1.1 The effects on farm holdings have been assessed according to the methodology set out in the Addendum to the Scope and Methodology Report (Volume 5: Appendix CT-001-000/2). The necessary data has been collected through contact and/or interviews with affected farmers and other rural interest along the route. Where has not been possible, the data has been estimated.
- 4.1.2 The nature of impacts considered comprises the temporary and permanent land requirements from the holding, the temporary and permanent severance of land, the permanent loss of key farm infrastructure and the imposition of disruptive effects (particularly noise and dust) on land uses and the holding's operations. These impacts occur primarily during the construction phase of the Proposed Scheme and are set out in Table 4.

Table 4: Summary of assessment of effect on holdings

| Holding reference, name and description | Construction effects | Residual effects |
|---|---|--|
| CFA 25/1 Twisted Oak Stables 11.8 ha equestrian High sensitivity to change | <p>Land required: 8.3ha; 70% of holding required for construction. High impact.</p> <p>Land required for the construction of the route in cutting through the length of the holding.</p> <p>All land within the holding to the north of the Birmingham Road is required for ecological mitigation works. Land is also affected by the diversion of an oil pipeline.</p> <p>Severance: No severance effects are introduced. Negligible impact.</p> <p>Disruptive effects: Construction works to the Birmingham Road may interfere with access to the holding and the proximity of stable buildings to construction activity may render their use unattractive to livery clients. Medium to high impact.</p> <p>Overall temporary assessment: Major impact - significant.</p> | <p>Land required: 7.6ha; 64% of holding taken.</p> <p>Land forming the route and all land within the holding to the north of the B4118 Birmingham Road is required for ecological mitigation works.</p> <p>Severance: No severance effects are introduced. Negligible impact.</p> <p>Infrastructure: None directly affected.</p> <p>The extent of permanent land requirements for railway and ecological mitigation works may render continued commercial use of the stables and exercise area unsustainable.</p> <p>Overall permanent assessment: Major impact - significant.</p> |
| CFA 25/2 Land north of B4118 Birmingham Road 2.3 ha equestrian Low sensitivity to change | <p>Land required: 2.3ha; 100 % of holding required for construction. High Impact.</p> <p>The whole holding is required for ecological mitigation works.</p> <p>Severance: No severance effects are introduced. Negligible impact.</p> <p>Infrastructure: Loss of stables and associated land. Use of land displaced. High impact.</p> <p>Overall temporary assessment: Moderate impact</p> | <p>No residual effects - holding removed at construction stage.</p> |

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| Holding reference, name and description | Construction effects | Residual effects |
|--|--|--|
| | due to low sensitivity - significant. | |
| <p>CFA 25/3</p> <p>Park Hall nature reserve</p> <p>40.1ha nature conservation</p> <p>Low sensitivity to change</p> | <p>Land required 37.9ha; 95% of holding required for construction. High impact</p> <p>Land required for the route and works to River Tame and affected by remodelling for flood management purposes. Temporary requirements for works compounds and haul roads.</p> <p>Severance: The eastern part of the nature reserve will form a residual unaffected area. It will be severed from its existing access from the Birmingham Road, but the Proposed Scheme contains provision for a replacement, which may be available during construction.</p> <p>Disruptive effects: Loss of a variety of habitats due to the remodelling of the floodplain to provide more effective flood capacity.</p> <p>Overall temporary assessment: Moderate impact - significant.</p> | <p>Land required: 6.2 ha; 16% of holding taken. Medium impact</p> <p>Land affected by remodelling for flood management purposes will be reinstated using conserved soil resources and be available for nature conservation purposes compatible with the flood management function.</p> <p>Severance: Severance by the route of the Proposed Scheme will be at viaduct level and land uses relevant to the nature reserve will be possible beneath it.</p> <p>Infrastructure: Not applicable.</p> <p>Overall permanent assessment: Minor impact - not significant</p> <p>Non-commercial land use; low sensitivity, but medium magnitude of land requirement. Low long term adverse effect in land use terms due to conservation of soil resources and re-establishment of nature conservation purposes.</p> |

5 References

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<http://bgs.ac.uk/geologyofbritain/home/html>.

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[www.forestry.gov.uk/pdf/WRAP2013.pdf/\\$FILE/WRAP2013.pdf](http://www.forestry.gov.uk/pdf/WRAP2013.pdf/$FILE/WRAP2013.pdf)

LandIS Land Information System, *A Guide to the Soils of England and Wales, Online Interactive Toolkit*

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